Abstract of the Disclosure

A silicon optoelectronic device includes an optoelectronic device portion and a switching portion. The switching portion selectively controls the emission and detection of light by the optoelectronic device portion. The optoelectronic device portion includes: a doped region of the opposite type to an n- or p-type silicon-based substrate, in which emission and detection of light occurs due to quantum confinement effect at the p-n junction between the doped region and the substrate, and at least one semiconductor material region formed on the rear surface of the substrate, at least a portion of which forms a stack structure with the doped region so that a built-in transistor is formed. The silicon optoelectronic device allows selective light emission and detection without any external amplifying and switching circuits, easy control the duration of light emission and detection, and can be manufactured in a series of semiconductor fabrication process.